ABSTRACT

Novel, monodispersed, spherical ZrO_2 particles in the size range of approximately 10 to approximately 600 nm exhibiting metastable tetragonal crystal structure at room temperature and novel methods of preparation. The ZrO_2 particles are approximately 100% in the tetragonal phase at room temperature and can be pure and free of foreign oxides. The novel method can include mixing zirconium-alkoxide and an alcohol, forming preparation one, followed by separately dissolving completely de-ionized water and a polymeric steric stabilizer in an alcohol forming preparation two. Next the preparations can be mixed with vigorous stirring while subjecting the materials to hydrolysis and condensation reactions with very slow stirring. Next, there is waiting for the formation of a sol from the mixture, followed by drying at approximately 80 degrees C to form resultant material followed by crushing the resultant material.